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ENERGY CONVERSION DEVICES, INC.
2956 WATERVIEW DRIVE
ROCHESTER HILLS, MI 48309

EXAMINER

ZERVIGON, RUDY

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1763

DATE MAILED: 08/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/043,010

Applicant(s)

OVSHINSKY, STANFORD R.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-16 and 18-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-16 and 18-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

There is no oath or declaration present.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-4, 8-11, 13-16, 20, 22, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Drage; David J. (US 4,590,042 A). Drage teaches a gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) for plasma (abstract) enhanced deposition of semiconductor materials onto one or more webs ("wafer"; throughout) of substrate ("wafer"; throughout) material comprising: (a) a cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) having two opposed planar surfaces (entrance and exit of conduit 34; Figure 4) and at least one peripheral edge (outer radial portion of 13 on lower surface; Figure 1); (b) a process gas distribution system (34, 35; Figure 4; column 3; line 65 - column 4; line 29) integrated within said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) and including process gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) which are evenly dispersed on planar surfaces of said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25); and (c) one or more gas dispersion plates (15; Figure 1; column 2; lines

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26-68) covering said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) so as to prevent direct, line-of-sight travel of process gas from said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) to a substrate ("wafer"; throughout) upon which semiconductor material is to be deposited, as claimed by claim 1

Drage further teaches:

- i. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 1, wherein said process gas distribution system (34, 35; Figure 4; column 3; line 65 - column4; line 29) includes at least one primary process gas distribution manifold (22; Figure 1,2), as claimed by claim 2
- ii. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 2, wherein said process gas distribution system (34, 35; Figure 4; column 3; line 65 - column4; line 29) includes one or more secondary process gas distribution manifolds (21; Figure 1,2) connected to said primary process gas distribution manifold (22; Figure 1,2), as claimed by claim 3
- iii. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 3, wherein said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) are connected to said secondary process gas distribution manifolds (21; Figure 1,2), as claimed by claim 4
- iv. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 1, wherein said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) are evenly positioned across two opposite surfaces of said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), as claimed by claim 5

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- v. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 1, further including a spent gas evacuation system (37, 42, 41, and 31; Figure 4), as claimed by claim 8
- vi. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 1, wherein said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), said process gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) and said gas dispersion plates (15; Figure 1; column 2; lines 26-68) are formed from a metal (column 5; lines 29-35) or metallic alloy which is nonreactive with said process gases, as claimed by claim 11 – Applicant’s claim requirement of “nonreactive said process gases” is a claim requirement of intended use. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- vii. A apparatus (Figure 1) for the plasma (abstract) enhanced deposition of semiconductor materials onto one or more webs (“wafer”; throughout) of substrate (“wafer”; throughout) material, said chamber (volume confined by 14; Figure 1) including: a gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) comprising: (a) a cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) having two

opposed planar surfaces (entrance and exit of conduit 34; Figure 4) and at least one peripheral edge (outer radial portion of 13 on lower surface; Figure 1); (b) a process gas distribution system (34, 35; Figure 4; column 3; line 65 - column4; line 29) integrated within said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) and including process gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) which are evenly positioned (Figure 4) across both of said two opposed planar surfaces of said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25); and (c) one or more gas dispersion plates (15; Figure 1; column 2; lines 26-68) covering said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) so as to prevent direct, line-of-sight travel of process gas from said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) to a substrate ("wafer"; throughout) upon which semiconductor material is to be deposited, as claimed by claim 13

- viii. The apparatus (Figure 1) of claim 13, wherein said process gas distribution system (34, 35; Figure 4; column 3; line 65 - column4; line 29) includes at least one primary process gas distribution manifold (22; Figure 1,2), as claimed by claim 14
- ix. The apparatus (Figure 1) of claim 14, wherein said process gas distribution system (34, 35; Figure 4; column 3; line 65 - column4; line 29) includes one or more secondary process gas distribution manifolds (21; Figure 1,2) connected to said primary process gas distribution manifold (22; Figure 1,2), as claimed by claim 15
- x. The apparatus (Figure 1) of claim 15, wherein said gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) are connected to said secondary process gas distribution manifolds (21; Figure 1,2), as claimed by claim 16

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- xi. The apparatus (Figure 1) of claim 13, wherein said cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) further including a spent gas evacuation system (37, 42, 41, and 31; Figure 4), as claimed by claim 20
- xii. The apparatus (Figure 1) of claim 9, wherein said spent gas inlets (37; Figure 4) are connected to a spent gas collection/removal manifold (23; Figure 2) system, as claimed by claim 22
- xiii. The apparatus (Figure 1) of claim 13, wherein said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), said process gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) and said gas dispersion plates (15; Figure 1; column 2; lines 26-68) are formed from a metal (column 5; lines 29-35) or metallic alloy which is nonreactive said process gases, as claimed by claim 23

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 6, 7, 12, 18, 19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drage; David J. (US 4,590,042 A) in view of Dhindsa; Rajinder et al (US 6,786,175 B2).

Drage is discussed above. Drage does not teach:

- i. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 5, wherein said gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) are evenly positioned from 1 to 4 inches apart, as claimed by claim 6

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- ii. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 6, wherein said gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) are evenly positioned from 2 to 3 inches apart, as claimed by claim 7
- iii. The gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 11, wherein said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), said process gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) and said gas dispersion plates (15; Figure 1; column 2; lines 26-68) are formed from stainless steel, as claimed by claim 12
- iv. The apparatus (Figure 1) of claim 17, wherein said gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) are evenly positioned from 1 to 4 inches apart, as claimed by claim 18
- v. The apparatus (Figure 1) of claim 18, wherein said gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) are evenly positioned from 2 to 3 inches apart, as claimed by claim 19
- vi. The apparatus (Figure 1) of claim 23, wherein said cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), said process gas outlets (35; Figure 4; column 3; line 65 - column 4; line 29) and said gas dispersion plates (15; Figure 1; column 2; lines 26-68) are formed from stainless steel, as claimed by claim 24

Dhindsa teaches a stainless steel cathode showerhead (310; Figure 3) for plasma operations (column 8; lines 14-33) including process gas distribution holes (354; Figure 3) with optimal spacing as taught by Dhindsa.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made for Drage to use stainless steel material for his Drage's dispersion plates (15; Figure 1; column 2; lines 26-68) and for Drage to optimize the dimension between Drange's gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) as taught by Dhindsa.

Motivation for Drage to use stainless steel material for his Drage's dispersion plates (15; Figure 1; column 2; lines 26-68) and for Drage to optimize the dimension between Drange's gas outlets (35; Figure 4; column 3; line 65 - column4; line 29) as taught by Dhindsa is to enhance transfer heat through Drange's dispersion plates as taught by Dhindsa (column 8; lines 14-33) and to optimize the gas flow of Drange's process as taught by Dhindsa (column6; lines 15-30). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

6. Claims 9, 10, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drage; David J. (US 4,590,042 A) in view of Sukharev (USPat. 6,030,460). Drage is discussed above. Drange further teaches Drage's gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 9, wherein Drage's spent gas inlets (37; Figure 4) are connected to a spent gas collection/removal manifold (23; Figure 2) system, as claimed by claim 7.

Drage does not teach:

- i. Drage's gas distribution cathode (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25) of claim 8, wherein Drage's spent gas evacuation system (37, 42, 41, and 31; Figure 4)

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includes spent gas inlets (37; Figure 4) evenly positioned exclusively along Drage's at least one peripheral edge of Drage's cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), as claimed by claim 9

- ii. Drage's apparatus (Figure 1) of claim 20, wherein Drage's spent gas evacuation system (37, 42, 41, and 31; Figure 4) includes spent gas inlets (37; Figure 4) evenly positioned exclusively along Drage's at least one peripheral edge of Drage's cathode body (13; Figure 1; column 2; lines 26-68; column 4; lines 17-25), as claimed by claim 21

Sukharev teaches an apparatus (Figure 3) wherein Sukharev's spent gas evacuation system (312, 314; Figure 3) includes spent gas inlets (312; Figure 3) evenly positioned exclusively along Sukharev's at least one peripheral edge of Sukharev's gas distribution apparatus (308-310; Figure 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Drage to replace his gas distribution and collection elements (13, 14 Figure 1) with Sukharev's gas distribution and collection apparatus (308-310, 312; Figure 3).

Motivation for Drage to replace his gas distribution and collection elements (13, 14 Figure 1) with Sukharev's gas distribution and collection apparatus (308-310, 312; Figure 3) is for removing by-products as taught by Sukharev (column 6, lines 1-13) and for increasing the rate of deposition (column 3, lines 15-20) as taught by Sukharev.

Response to Arguments

8. Regarding the Examiner's holding of defective oath. The Examiner does identify the August 27, 2004 petition decision which identifies Applicant's response to the notice of missing parts. However, the Examiner finds no evidence of Applicant's response to the notice of missing

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parts including a signed and properly executed oath. The Examiner maintains his position until said documents are made of record in the file.

9. Applicant's arguments are centered on Applicant's amendment to the claims. In response, the Examiner directs Applicant to the above new grounds of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

11. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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8/29/5